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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,341	11/18/2003	Takanori Nishio	16869K-040510US	8188

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EXAMINER	
ROJAS, MIDYS	
ART UNIT	**PAPER NUMBER**
2185	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/717,341	NISHIO ET AL.	
	Examiner	Art Unit	
	Midys Rojas	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 January 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-12 and 21-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-12 and 21-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 January 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/30/08; 12/6/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed on 1/11/08 have been fully considered but are not persuasive.

Applicant argues that none of the references being relied upon teach a disk array accessed by one or more host computers. However, Blumenau discloses a disk array 101-1 accessed by one or more host computers (150-152) via switch 250 (see Figure 6).

Applicant also argues that the references relied upon do not teach determining insufficient free space and performing a mount operation from the data storage system on remote storage disks. Applicant explains that these limitations are not shown in Blumenau because the reference discloses mounting storage directly on the host computers while the claim is drawn to performing the mount operation from the storage system on remote storage disk units. However, the combination of the references relies on Igami for the teaching of detecting free space. Blumenau teaches performing a mount operation from the data storage system (Col. 2, lines 44-55 wherein the mount operation is from the data storage system since the mounting information is provided by the storage system) on remote storage disks (the mounting involves associating the mounted volume 113 with the remote storage devices 114-116, Col. 13, lines 44-65).

Drawings

2. The drawings filed on 1/11/08 have been accepted by the examiner.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 1/30/08 and 12/6/07 were considered by the examiner.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 10, 11, 12, and 21-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoroff et al. (6,023,744) in view of Blumenau (6,631,442) and further in view of Igami et al. (6,622,223).

Regarding Claim 10, Shoroff discloses a method of operating a storage system wherein when a storage system detects that an amount free space of the storage system has become less than a predetermined value, wherein the predetermined value is prearranged to be that of the size of the processed data; a local storage area provided by the storage system is made available as said storage area (Column 10, lines 45-54) thus extending its available storage area. This system determines if certain processed data, whose size is of a predetermined value, will fit in the remaining space in the target file. If the space is not sufficient, additional disk space is requested from the file system in order to enlarge the target file (see Figure 12 and Column 4, lines 39-45). In this case, the request for additional storage space is equivalent to an utilization demand message. Shoroff does not teach performing a mount operation on one or more disk units so that a remote storage area may serve to extend the available storage area. Shoroff also doesn't teach

using the size and speed (reading or writing) of said remote storage area to select the remote storage area to be used.

Blumenau discloses a disk array system (101-1) accessed one or more host computers (150-152) via a switch (250, Figure 6) wherein the reference discloses mounting of a remote volume for the purpose of making it available for use by a local storage system (See Column 2, lines 44-66). Blumenau teaches performing a mount operation from the data storage system (Col. 2, lines 44-55 wherein the mount operation is from the data storage system since the mounting information is provided by the storage system) on remote storage disks (the mounting involves associating the mounted volume 113 with the remote storage devices 114-116, Col. 13, lines 44-65). Blumenau additionally teaches retrieving a required volume's size (see Figure 3, step 303) and architecture specific access information (such as access speed, operating system, memory architecture) for use while configuring the remote volume's association (see Column 9, lines 45 – Column 10, lines 6; Column 10, lines 20- 44; Column 10, lines 57-65). The system of Blumenau also discloses the association of a unit ID (volume identifier) with a port ID (mount point) through the use of a port management table (mount point directory, Col. 2, lines 44-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the storage system of Shoroff to include to mounting operation of Blumenau and use size and access information parameters for the selection of the remote storage volume for memory extension. In allowing the system of Shoroff to seek additional storage space from remote sites through the use of a mounting operation, the system can further expand its storage capacity without being limited to the storage that is available locally. In allowing the system of Shoroff to implement the use of size and access information parameters for the selection of the

remote storage volume to be used for memory extension, the system can guarantee that the remote storage volume provided for expansion has enough space available to satisfy the storage needs of the local system and that the remote storage volume can be accessed at the same speed as local volumes (thus preventing the need to slower accessing times). It is understood that in the communication between remote storage units, the sending of packets is commonly involved.

Shoroff in view of Blumenau does not teach operating the storage system by detecting the amount of free space. Instead, Shoroff in view of Blumenau discloses operating the storage system by determining if certain processed data, whose size is of a predetermined value, will fit in the remaining space in the target file. Igami et al. discloses a detection section 107 that detects the free space of a memory buffer 106. Then, the system determines if the remaining space is large enough (Col. 6, lines 30-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Shoroff in view of Blumenau to operate the storage system by detecting the amount of free space as done by Igami since Shoroff already discloses the need to determine if a particular file fits in the available memory and Igami's method of making the determination (by detecting the free space) is a straight forward way of making such a determination.

Claim 11 is rejected using the same rationale as that of Claim 10 wherein the combination detects that a remaining amount of its own storage area has become less than a predetermined value by determining if certain processed data, whose size is of a predetermined value, will fit in the remaining space in the target file. If the space is not sufficient, additional disk space is requested from the file system in order to enlarge the target file (see Figure 12 and Column 4, lines 39-45). Shoroff and Igami disclose monitoring a utilization state of said

additional (both remote and non remote) storage area for said storage system (Shoroff Column 10, lines 45-54; Igami Col. 6, lines 30-55). Shoroff discloses determining whether or not said storage area in said storage system is to be increased is according to said utilization state. Shoroff determines if the processed data fits in the remaining space of the target file. Such a determination requires the monitoring of the used capacity of the target file as well as monitoring of the space available in the remote storage ("utilization state"). Referring to Figure 12, step 206 reads the used capacity of the target file, calculates how much empty space is remaining in the target file and then determines if the processed data fits into the target file. In step 208 a calculation is made as to how much of the remote storage is needed to fit the processed data in the target file and such storage amount is used to increase the target file (decide whether or not one or more spare disk units is to be used).

Claim 12 is rejected using the same rationale as that of Claim 10 wherein allowing the system of Shoroff to seek additional storage space from remote sites, the system can further expand its storage capacity without being limited to the storage that is available locally. Blumenau also discloses the local storage system (host) accessing the remote storage system for the purposes of memory expansion via an associated identifier allowing access to the remote volume as a regular volume of data storage (Column 19, lines 20-35). Since the remote storage volume can be accessed as a local storage volume through the identifier, it has basically become part of the local storage system, in doing so, the data that is stored in the remote storage volume has essentially been "copied" over to be part of the local storage system. In combining the inventions of Shoroff with that of Blumenau, the resulting invention performs the remote storage

access as done by Blumenau and therefore essentially "copies" the data in the remote storage system over to be part of the local storage system.

Claim 21 is rejected using the same rationale as that of Claim 10.

Claim 22 is rejected using the same rationale as that of Claim 12.

Claims 23-25 are rejected using the same rationale as that of Claim 21 wherein the unit id is referred to as a disk identifier by Blumenau (Col. 2, lines 44-58).

Regarding Claim 26, Shorroff et al. discloses the method of operating a storage system according wherein the utilization demand message (request, Col. 10, lines 45-56) specifies a write-in command for writing data to a remote storage area of the remote storage system, the method further comprising: writing the data to the remote storage area; indicating that the write-in command was normally completed if the write-in command was performed normally, and otherwise indicating that the write-in command was not performed normally (determining the status of the data read or safely written through the use of pointers, col. 11, lines 1-20).

Regarding Claim 27, Shorroff et al. discloses the method of operating a storage system wherein the utilization demand message specifies a read-out command for reading data from a remote storage area of the remote storage system, the method further comprising: reading the data from the remote storage area designated by the remote unit ID; indicating that the read-out in command was normally completed if the read-out command was performed normally, and otherwise indicating that the read-out command was not performed normally (determining the status of the data read or safely written through the use of pointers, col. 11, lines 1-20).

Claim 28 is rejected using the same rationale as that of Claim 10 wherein Shoroff et al. in view of Blumenau and further in view of Igami et al. teach a storage system coupled to a

computer (Blumenau, Figure 7); and a remote storage system coupled to said storage system (Mobile Volume 1); wherein said storage system comprises: a computer interface in communication with a host computer (switch interconnect 250), a plurality of disk units for data storage (114-1, 115-1, 115-2), and a disk adapter coupled to said plurality of disk units (function of Mobile Volume 1 unit); and a cache memory (Igami, buffer memory 106, Figure 1).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Midys Rojas whose telephone number is (571) 272-4207. The examiner can normally be reached on M-TH 6:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Midys Rojas/
Examiner, Art Unit 2185

MR

/Sanjiv Shah/
Supervisory Patent Examiner, Art Unit 2185